

ABSTRACT

BACKGROUND:

Healing of extracted socket involves a highly coordinated sequence of biochemical, physiologic, cellular, and molecular responses that includes numerous cell types, growth factors, hormones, cytokines, and other proteins directed toward restoring tissue integrity and functional capacity after injury. It can be seen as a specialized example of healing by second intention.

Although there is a relatively low incidence of healing complications, the resorption of edentulous bone can significantly affect the height and width of the residual alveolar ridge which has an impact on the prosthesis.

A biologic approach to promote the wound healing cascade is through the use of platelet-rich plasma (PRP), which acts by releasing therapeutic growth factors directly to the wound. The majority of studies on PRP in Oral and Maxillofacial Surgery have focused on enhancing graft healing and dental implants. PRP was first introduced to the Oral surgery community by Whitman et al (1997), though its use gained popularity after the study publication of Marx et al (1998).

Aim:

To evaluate the efficacy of PRP Lysate (L-PRP) in bone regeneration and to assess the clinical compatibility of the product in extracted molar sockets at different timings.

Objective of the study:

To compare the soft tissue healing and hard tissue regeneration of extracted molar sockets, with and without the use of L-PRP.

Materials and Methods

PRP Lysate (L-PRP) is a newer biomaterial introduced by Mother Cell Regenerative Centre, Tiruchirapalli. This product is obtained from sterile buffy coats from Certified Blood Transfusion Centres.

Platelets are activated and lysed to release important growth factors. Lysate is concentrated to standard efficacious therapeutic dose and freeze-dried for long term storage at room temperature without moisture. The product is available in 50mg powder form of particle sized 50µg.

This study was undertaken at the department of Oral and Maxillofacial Surgery, Rajas Dental College and Hospital Kavalkinaru, after obtaining ethical clearance. This study involved both male and female patients, who were referred to the department of Oral and Maxillofacial Surgery requiring bilateral molar extractions and were selected according to the following inclusion and exclusion criteria.

Inclusion Criteria

- Patients' age between 18 and 50 years.
- Patients requiring bilateral molar extractions.
- Patients requiring surgical removal of bilaterally impacted third molars by conventional bur technique.

Exclusion Criteria

- Patients with acute infections.
- Opposing traumatic occlusion or impinging upper molars.
- Smokers, alcoholics and patients with any systemic diseases.
- Those patients with incomplete follow up.

After complete history taking and clinical examination, patients were explained about the procedure, its complications and the follow-up period of the study. The patients who agreed to be included in the study were enrolled for the study and an informed consent was taken from each one of them.

Pre-operative radiographic investigation consisted of an OPG or an IOPA radiograph. The control and PRP side were chosen randomly. Post extraction, the PRP powder was sprinkled into the extracted socket on the case side, whereas no intrasocket medication was used on the control side. In both of these sides, primary closure was done. The sample size included in this study was 20 patients. The patients were assessed on day 1, and 7 for soft tissue healing.

Radiographic assessment for bone healing was done at 3rd month using Cone beam Computed Tomography (CBCT).

Clinical evaluation

Soft tissue healing was assessed based on the criteria given by Landry et al.

Bone healing of the extracted molar sockets was assessed using a CBCT and overall density was recorded in terms of Hounsfield Unit (HFU).

STATISTICAL ANALYSIS:

After analysis of the data, the following observations were made:

The patients included in the study were in the age group of 18–50 years. Totally, there were 5 male and 15 female patients.

RESULTS:

Clinical assessment

Assessment of healing index of soft tissue:

Test statistic – Wilcoxon signed rank test, which showed a significant p-value on the 1st and 7th post-operative days on comparing the PRP and control sides.

Radiographic assessment:

Radiographic assessment in HFU seen at 3rd post-operative month.

Test statistic – Friedman's test, which showed a mean value of 591.6 and 421.8 respectively for the PRP and control sides.

SUMMARY AND CONCLUSION:

Thus, PRP increases the concentration of platelets, which contains more growth factors that have been associated with improved, faster healing and new bone formation in bone defects. Surgical sites treated with PRP have shown to heal better, about two to three times that of the normal surgical sites.

This study clearly demonstrates a definitive improvement in the soft tissue healing and faster regeneration of bone in the extracted molar sockets treated with L-PRP as compared to the control group, post operatively. This signifies and highlights the use of L-PRP as a valid method in inducing and accelerating soft and hard tissue regeneration, without any donor site morbidity.

KEYWORDS: Platelet rich plasma, Growth factors, Wound healing, Soft tissue healing, Bone density, Molar extraction socket, Cone Beam Computed Tomography, Bone density.